Guidelines

COPD diagnosis, management and prevention—2019 strategy

By Global Initiative for Chronic Obstructive Lung Disease | 4 December 2018

- **Download the full GOLD strategy for chronic obstructive pulmonary disease (COPD):***
  - *Pocket guide to COPD diagnosis, management, and prevention: a guide for health care professionals*
  - *Global strategy for diagnosis, management, and prevention of COPD*

Read this summary and then 'Test and reflect' using our multiple-choice questions.
Earn 0.5 CPD credits for reading the summary and an additional 0.5 CPD credits for completing the multiple-choice questions.

Diagnosis

Overall key point

- COPD should be considered in any patient who has dyspnoea, chronic cough or sputum production, and/or a history of exposure to risk factors for the disease

Key indicators for considering a diagnosis of COPD

- Consider COPD, and perform spirometry, if any of these indicators are present in an individual over age 40. These indicators are not diagnostic themselves, but the presence of multiple key indicators increases the probability of a diagnosis of COPD. Spirometry is required to establish a diagnosis of COPD
- Dyspnoea that is:
  - progressive over time
  - characteristically worse with exercise

- persistent

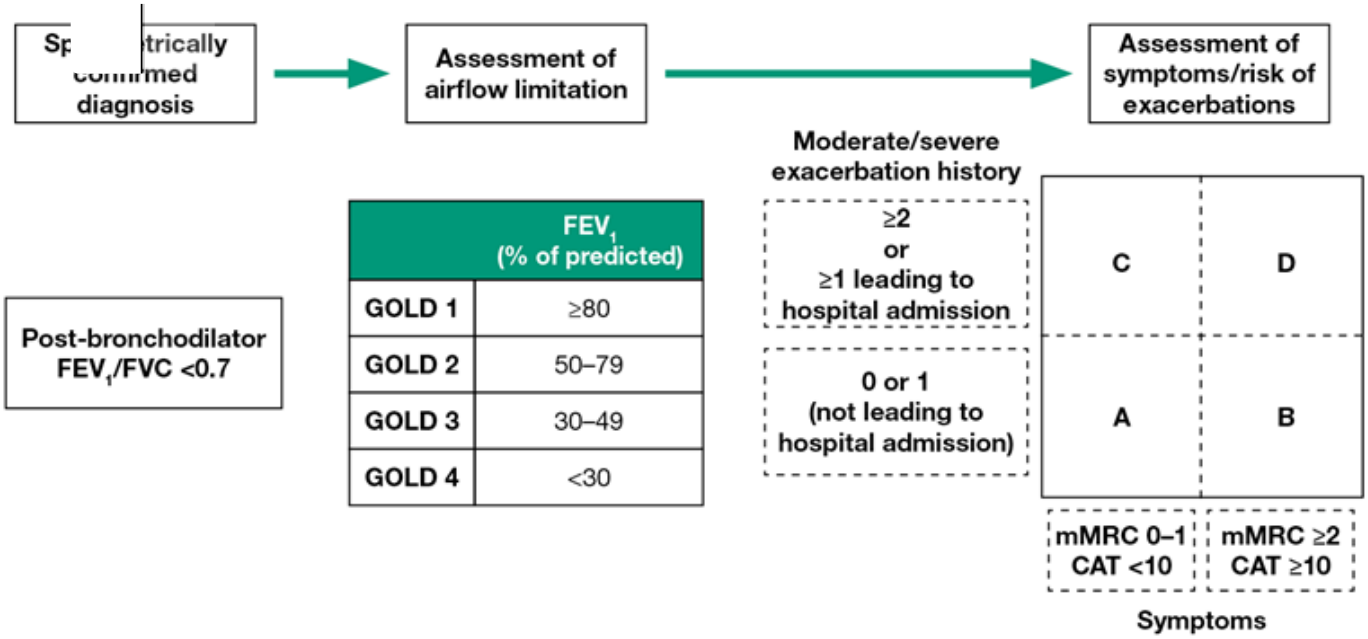
- Chronic cough:
  - may be intermittent and may be unproductive
  - recurrent wheeze
- Chronic sputum production:
  - any pattern of chronic sputum production may indicate COPD
- Recurrent lower respiratory tract infections
- History of risk factors
  - host factors (such as genetic factors, congenital/developmental abnormalities)
  - tobacco smoke (including popular local preparations)
  - smoke from home cooking and heating fuels
  - occupational dusts, vapours, fumes, gases, and indoor and outdoor air pollution
- Family history of COPD and/or childhood factors:
  - for example, low birthweight, childhood respiratory infection

Assessment

Classification of airflow limitation severity in COPD (based on post-bronchodilator FEV_1)

- In patients with $FEV_1/FVC < 0.70$:
  - GOLD 1—mild: $FEV_1 \geq 80\%$ predicted
  - GOLD 2—moderate: $50\% \leq FEV_1 < 80\%$ predicted
  - GOLD 3—severe: $30\% \leq FEV_1 < 50\%$ predicted
  - GOLD 4—very severe: $FEV_1 < 30\%$ predicted

Revised combined COPD assessment



FEV_1=forced expiratory volume in the first second; FVC=forced vital capacity; mMRC=modified Medical Research Council; CAT=COPD assessment test.

GOLD COPD ABCD tool

- In the revised assessment scheme (above), patients should undergo spirometry to determine the severity of airflow limitation (i.e., spirometric grade). They should also undergo assessment of either dyspnoea using modified Medical Research Council (mMRC), or symptoms using COPD assessment test (CAT). Finally, their history of exacerbations (including prior hospitalisations) should be recorded
- The number provides information regarding severity of airflow limitation (spirometric grade 1 to 4) while the letter (groups A to D) provides information regarding symptom burden and risk of exacerbation which can be used to guide therapy
- Example: Consider two patients—both patients with FEV_1 <30% of predicted, CAT scores of 18 and one with no exacerbations in the past year and the other with three exacerbations in the past year. Both would have been labelled GOLD D in the prior classification scheme. However, with the new proposed scheme, the subject with three exacerbations in the past year would be labelled GOLD grade 4, group D

Differential diagnosis of COPD

Diagnosis	Suggestive features
COPD	Onset in mid-life Symptoms slowly progressive History of tobacco smoking or exposure to other types of smoke Physical activity Flu vaccination Pneumococcal vaccination
Asthma	Onset early in life (often childhood) Symptoms vary widely from day to day Symptoms worse at night/early morning Allergy, rhinitis, and/or eczema also present Family history of asthma Obesity coexistence
Congestive heart failure	Chest X-ray shows dilated heart, pulmonary oedema. Pulmonary function tests indicate volume restriction, not airflow/imitation
Bronchiectasis	Large volumes of purulent sputum Commonly associated with bacterial infection Chest X-ray/CT shows bronchial dilation, bronchial wall thickening.
Tuberculosis	Onset all ages Chest X-ray shows lung infiltrate Microbiological confirmation High local prevalence of tuberculosis
Obiterative bronchiolitis	Onset at younger age, non-smokers May have history of rheumatoid arthritis or acute fume exposure Seen after lung or bone marrow transplantation CT on expiration shows hypodense areas
Diffuse panbronchiolitis	Predominantly seen patients of Asian descent Most patients are male and non-smokers Almost all chronic sinusitis Chest/X-ray and high-resolution computed tomography show diffuse small centrilobular nodular opacities and hyperinflation
These features tend to be characteristic of the respective diseases, but are not mandatory. For example, a person who has never smoked may develop COPD (especially in the developing world where other risk factors may be more important than cigarette smoking); asthma may develop in adult and even in elderly patients.	

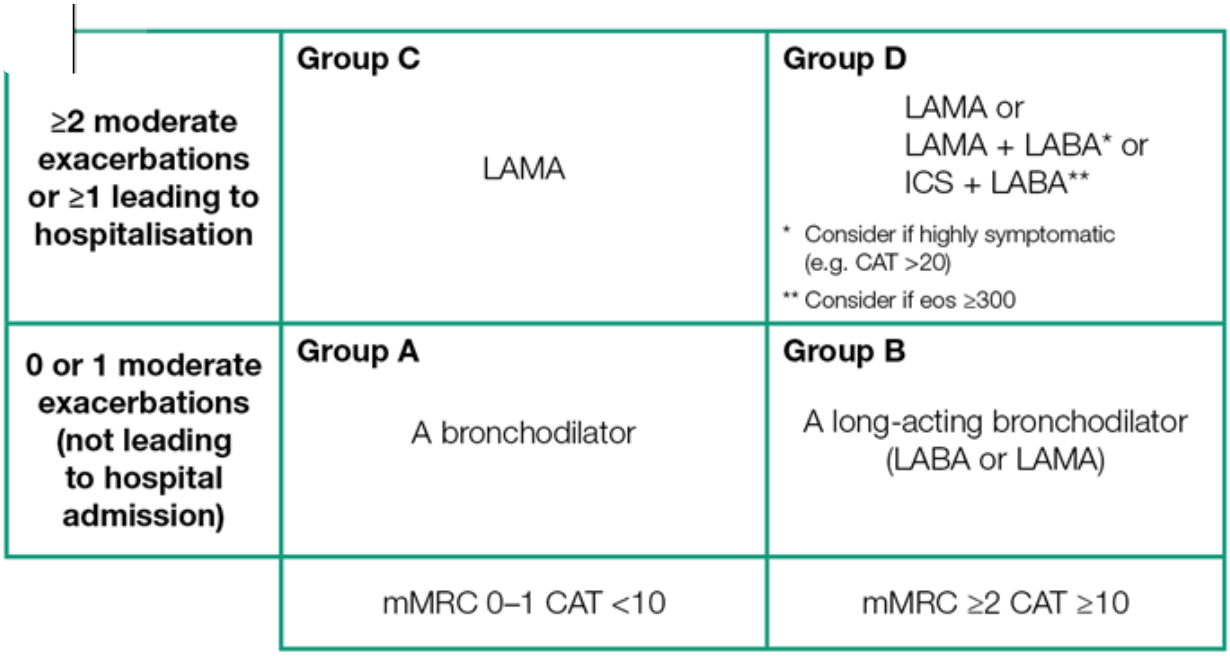
Management of stable COPD

- The management strategy for stable COPD should be predominantly based on the individualised assessment of symptoms and future risk of exacerbations
- All individuals who smoke should be strongly encouraged and supported to quit
- The main treatment goals are reduction of symptoms and future risk of exacerbations
- Management strategies are not limited to pharmacological treatments, and should be complemented by appropriate non-pharmacological interventions

A. Pharmacological treatment

1. Initial treatment

- See algorithm below



LAMA=long-acting muscarinic receptor antagonists; LABA=long-acting beta$_2$ agonist; ICS=inhaled corticosteroids; CAT=COPD assessment test; COPD=chronic obstructive pulmonary disease; eos=blood eosinophil count in cells per microliter; mMRC=modified Medical Research Council dyspnoea questionnaire.

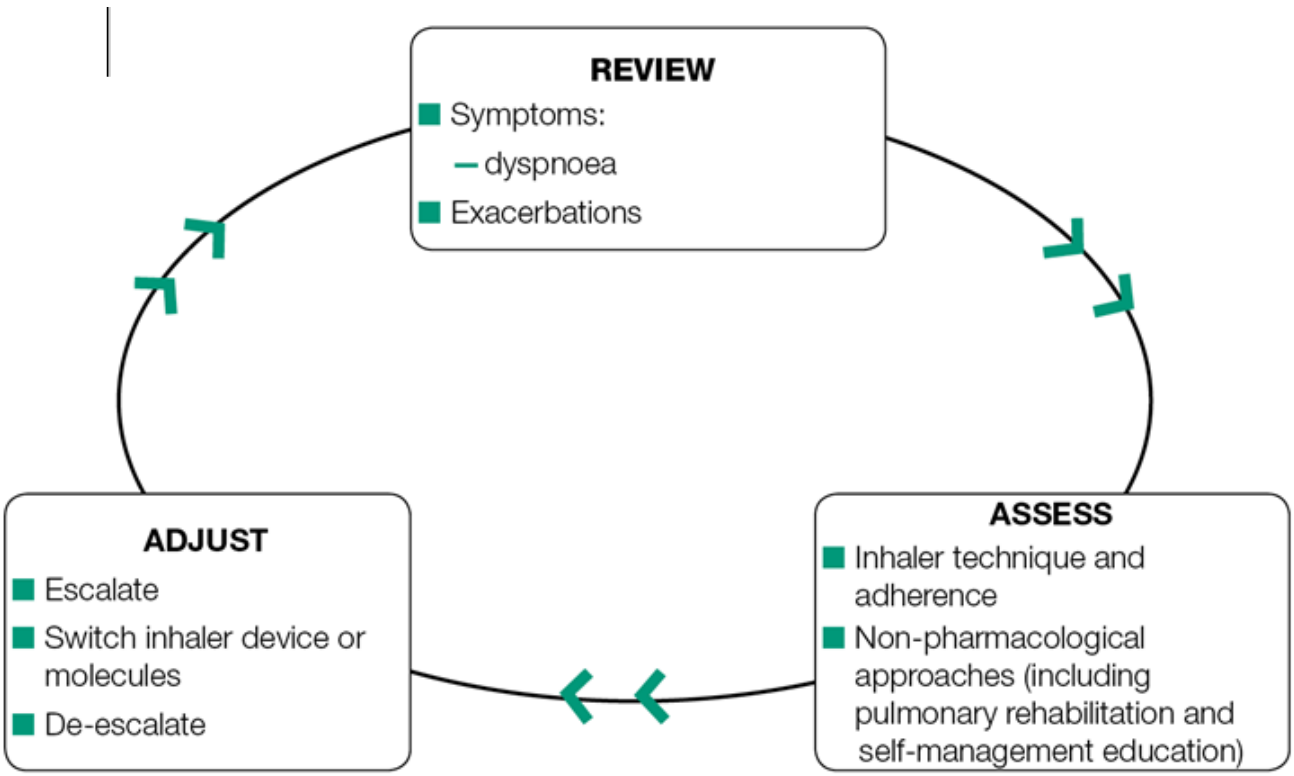
GOLD COPD strategy initial pharmacological treatment

- Group A:
  - all Group A patients should be offered bronchodilator treatment based on its effect on breathlessness. This can be either a short- or a long-acting bronchodilator
  - this should be continued if symptomatic benefit is documented
- Group B:
  - for patients with severe breathlessness initial therapy with two bronchodilators may be considered
- Group C:
  - initial therapy should consist of a single long-acting bronchodilator
- Group D:
  - in general, therapy can be started with a LAMA as it has effects on both breathlessness and exacerbations

- for patients with more severe symptoms (order of magnitude of CAT™ ≥20), especially driven by greater dyspnoea and/or exercise limitation, LAMA/LABA may be chosen as initial treatment
- in some patients, initial therapy with LABA/ICS may be the first choice; this treatment has the greatest likelihood of reducing exacerbations in patients with blood eosinophil counts ≥300 cells/μl. LABA/ICS may also be first choice in COPD patients with a history of asthma
- ICS may cause side-effects such as pneumonia, so should be used as initial therapy only after the possible clinical benefits versus risks have been considered

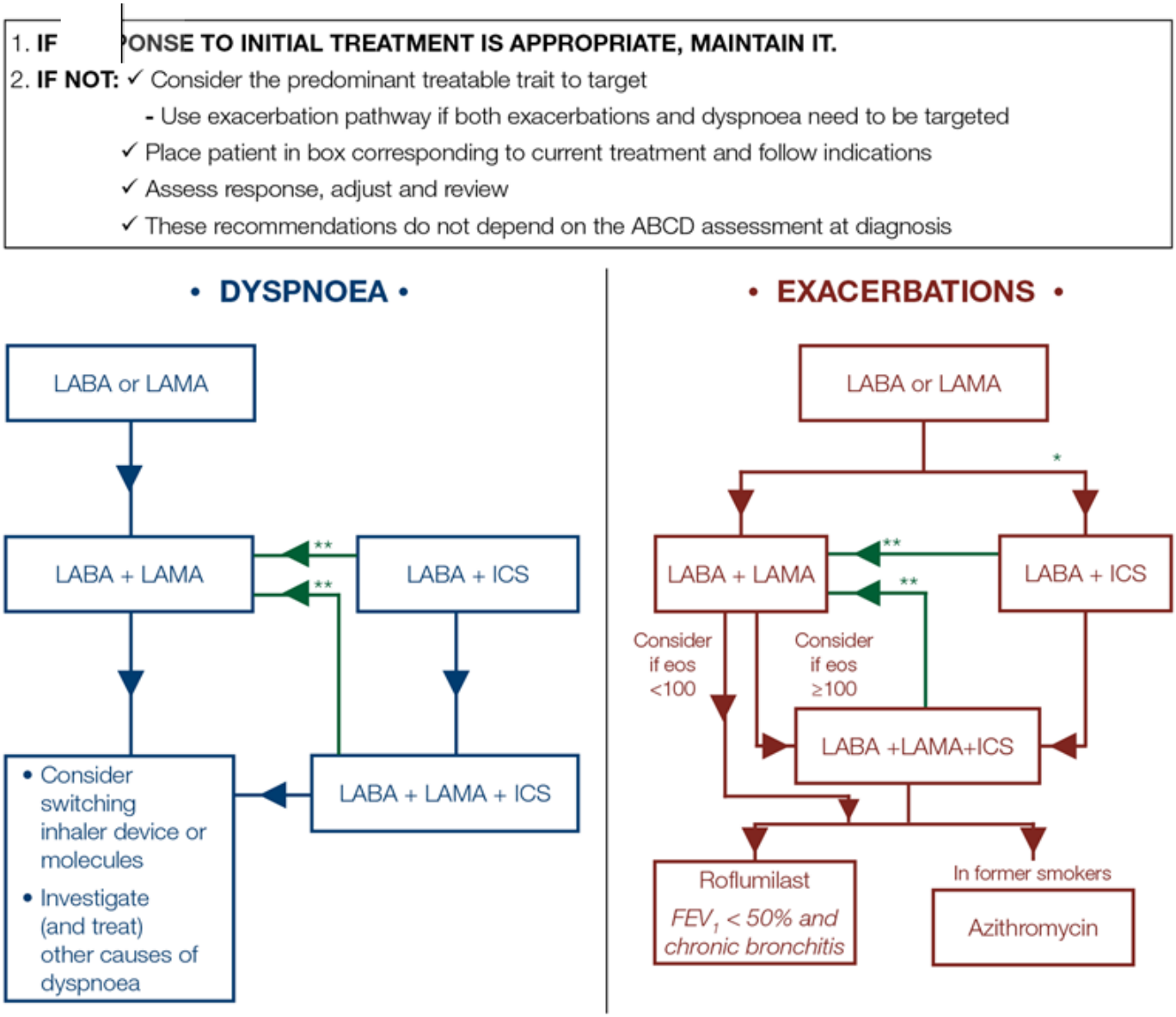
2. Management cycle

- Following implementation of therapy, patients should be reassessed for attainment of treatment goals and identification of any barriers for successful treatment (see figure below). Following review of the patient response to treatment initiation, adjustments in pharmacological treatment may be needed



GOLD COPD management cycle

3. Follow-up pharmacological management



GOLD COPD strategy follow-up pharmacological treatment

- The follow-up pharmacological treatment algorithm can be applied to any patient who is already taking maintenance treatment(s) irrespective of the GOLD group allocated at treatment initiation. The need to treat primarily dyspnoea/exercise limitation or prevent exacerbations further should be evaluated. If a change in treatment is considered necessary then select the corresponding algorithm for dyspnoea or exacerbations; the exacerbation algorithm should also be used for patients who require a change in treatment for both dyspnoea and exacerbations. Identify which box corresponds to the patient's the current treatment

Dyspnoea

- For patients with persistent breathlessness or exercise limitation on long acting bronchodilator monotherapy, the use of two bronchodilators is recommended:
    - if the addition of a second long acting bronchodilator does not improve symptoms, we suggest the treatment could be stepped down again to monotherapy. Switching inhaler device or molecules can also be considered
- For patients with persistent breathlessness or exercise limitation on LABA/ICS treatment, LAMA can be added to escalate to triple therapy:
    - alternatively, switching from LABA/ICS to LABA/LAMA should be considered if the original indication for ICS was inappropriate (e.g., an ICS was used to treat symptoms in the absence of a history of exacerbations), or there has been a lack of response to ICS treatment, or if ICS side-effects warrant discontinuation
- At all stages, dyspnoea due to other causes (not COPD) should be investigated and treated appropriately. Inhaler technique and adherence should be considered as causes of inadequate treatment response

Exacerbations

- For patients with persistent exacerbations on long acting bronchodilator monotherapy, escalation to either LABA/LAMA or LABA/ICS is recommended. LABA/ICS may be preferred for patients with a history or findings suggestive of asthma. Blood eosinophil counts may identify patients with a greater likelihood of a beneficial response to ICS. For patients with one exacerbation per year, a peripheral blood level ≥300 eosinophils/µl identifies patients more likely to respond to LABA/ICS treatment
- For patients with ≥2 moderate exacerbations per year or at least one severe exacerbation requiring hospitalisation in the prior year, LABA/ICS treatment can be considered at blood eosinophil counts ≥100 cells/µl, as ICS effects are more pronounced in patients with greater exacerbation frequency and/or severity
- In patients who develop further exacerbations on LABA/LAMA therapy we suggest two alternative pathways. Blood eosinophil counts <100 cells/µl can be used to predict a low likelihood of a beneficial ICS response:
    - escalation to LABA/LAMA/ICS. A beneficial response after the addition of ICS may be observed at blood eosinophil counts ≥100 cells/µl, with a greater magnitude of response more likely with higher eosinophil counts
    - add roflumilast or azithromycin (see below) if blood eosinophils <100 cells/µl

- In patients who develop further exacerbations on LABA/ICS therapy, we recommend escalation to triple therapy by adding a LAMA. Alternatively, treatment can be switched to LABA/LAMA if there has been a lack of response to ICS treatment, or if ICS side effects warrant discontinuation

- If patients treated with LABA/LAMA/ICS who still have exacerbations the following options may be considered:

    - add roflumilast. This may be considered in patients with an FEV_1 <50% predicted and chronic bronchitis, particularly if they have experienced at least one hospitalisation for an exacerbation in the previous year

    - add a macrolide. The best available evidence exists for the use of azithromycin, especially in those who are not current smokers. Consideration to the development of resistant organisms should be factored into decision-making.

    - stopping ICS. This can be considered if there are adverse effects (such as pneumonia) or a reported lack of efficacy. However, a blood eosinophil count ≥300 cells/µl identifies patients with the greatest likelihood of experiencing more exacerbations after ICS withdrawal and who subsequently should be followed closely for relapse of exacerbations

Blood eosinophil count

- The threshold of a blood eosinophil count >300 cells/µl identifies the top of the continuous relationship between eosinophils and ICS, and can be used to identify patients with the greatest likelihood of treatment benefit with ICS

- Thus, the use of blood eosinophil counts to predict ICS effects should always be combined with clinical assessment of exacerbation risk (as indicated by the previous history of exacerbations)

B. Non-pharmacological treatment

Patient group	Essential	Recommended	Depending on local guidelines
A	Smoking cessation (can include pharmacological treatment)	Physical activity	Flu vaccination Pneumococcal vaccination
B–D	Smoking cessation (can include pharmacological treatment) Pulmonary rehabilitation	Physical activity	Flu vaccination Pneumococcal vaccination

- Some relevant non-pharmacological measures for patient groups A to D are summarised above

Education, self-management and pulmonary rehabilitation

- Education is needed to change patient's knowledge but there is no evidence that used alone it will change patient behaviour
- Education self-management with the support of a case manager with or without the use of a written action plan is recommended for the prevention of exacerbation complications such as hospital admissions
- Rehabilitation is indicated in all patients with relevant symptoms and/or a high risk for exacerbation
- Physical activity is a strong predictor of mortality. Patients should be encouraged to increase the level of physical activity although we still don't know how to best insure the likelihood of success

Vaccination

- Influenza vaccination is recommended for all patients with COPD
- Pneumococcal vaccination: the PCV13 and PPSV23 are recommended for all patients >65 years of age, and in younger patients with significant comorbid conditions including chronic heart or lung disease

Nutrition

- Nutritional supplementation should be considered in malnourished patients with COPD

End of life and palliative care

- All clinicians managing patients with COPD should be aware of the effectiveness of palliative approaches to symptom control and use these in their practice
- End of life care should include discussions with patients and their families about their views on resuscitation, advance directives and place of death preferences

Treatment of hypoxemia

- In patients with severe resting hypoxemia long-term oxygen therapy is indicated
- In patients with stable COPD and resting or exercise-induced moderate desaturation, long term oxygen treatment should not be routinely prescribed. However, individual patient factors may be considered when evaluating the patient's needs for supplemental oxygen
- Resting oxygenation at sea level does not exclude the development of severe hypoxemia when travelling by air

Treatment of hypercapnia

- In patients with severe chronic hypercapnia and a history of hospitalisation for acute respiratory failure, long term noninvasive ventilation may be considered

Management of exacerbations

- An exacerbation of COPD is defined as an acute worsening of respiratory symptoms that results in additional therapy
- Exacerbations of COPD can be precipitated by several factors. The most common causes are respiratory tract infections
- The goal for treatment of COPD exacerbations is to minimise the negative impact of the current exacerbation and to prevent subsequent events
- Short-acting inhaled beta$_2$ -agonists, with or without short-acting anticholinergics, are recommended as the initial bronchodilators to treat an acute exacerbation
- Maintenance therapy with long-acting bronchodilators should be initiated as soon as possible before hospital discharge
- Systemic corticosteroids can improve lung function (FEV_1), oxygenation and shorten recovery time and hospitalisation duration. Duration of therapy should not be more than 5–7 days
- Antibiotics, when indicated, can shorten recovery time, reduce the risk of early relapse, treatment failure, and hospitalisation duration. Duration of therapy should be 5–7 days
- Methylxanthines are not recommended due to increased side-effect profiles
- Non-invasive mechanical ventilation should be the first mode of ventilation used in COPD patients with acute respiratory failure who have no absolute contraindication because it improves gas exchange, reduces work of breathing and the need for intubation, decreases hospitalisation duration and improves survival

- Following an exacerbation, appropriate measures for exacerbation prevention should be initiated

COPD and comorbidities

- COPD often coexists with other diseases (comorbidities) that may have a significant impact on disease course
- In general, the presence of comorbidities should not alter COPD treatment and comorbidities should be treated per usual standards regardless of the presence of COPD
- Lung cancer is frequently seen in patients with COPD and is a main cause of death
- Cardiovascular diseases are common and important comorbidities in COPD
- Osteoporosis and depression/anxiety are frequent, important comorbidities in COPD, are often under diagnosed, and are associated with poor health status and prognosis
- Gastroesophageal reflux is associated with an increased risk of exacerbations and poorer health status
- When COPD is part of a multimorbidity care plan, attention should be directed to ensure simplicity of treatment and to minimise polypharmacy

further information and downloads are available from...

www.goldcopd.org

Global Initiative for Chronic Obstructive Lung Disease. *Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease*. November 2018

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